

Sleep Quality of Residential Degree College Students During COVID-19 Pandemic

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ABSTRACT

Twenty first century residential educational institutions in India provide quality education and huge scope for overall personality development of talented candidates from marginalized communities. We hypothesized that a well-structured and protected lifestyle in these institutes wouldn't give rise to sleep problems. This study aimed to study the prevalence of poor sleep quality among marginalized women in social welfare residential degree colleges. We assessed Sleep quality of 805 female college students (18-25 years) using Pittsburgh Sleep Quality Index (PSQI) pre and post a non-interventional COVID-19 interval of twelve months. Initial assessment during 2020, revealed 65% (N=805) and a later assessment of the same students in 2021 revealed 52% (N=1252) prevalence of poor sleep quality among healthy girls. There is a need to address sleep health issues through proper interventions to enable better functioning in academics and highly goal oriented co-curricular endeavors of social welfare institutes.

Keywords: Residential, Prevalence, Sleep Quality, College, Girls

Residential educational institutions have begun way back in 1830s under Canadian Government with a motto of inculcating dominating culture among the children of the then society by separating them from the influence of their home environment[1]. Later, residential educational institutes underwent positive reformations across nations to eradicate poverty, illiteracy and downtrodden-ness among marginalized sections of the society. At present, residential educational institutes provide education to improve the lives and activities of its students [2].

In 21st century, the Telangana Social Welfare Residential Educational Institutions Society (TSWREIS) provided highly structured and protective environment under the eminent guidance of the present Secretary of the society, Dr. Repalle Shiva Praveen Kumar, IPS, the supreme Social Welfare AERO (SWAERO), under the aegis of Welfare Ministry, Telangana State Government. About 268 social welfare institutes with 1,50,000 students every year passionately work for the upliftment of upcoming generations of the marginalized communities. In addition to holistic, value based and quality education from secondary school to graduation, these institutes empower their students to explore the world through all

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Received: January 29, 2022; Revision Received: March 27, 2022; Accepted: March 31, 2022

Sleep Quality of Residential Degree College Students During COVID-19 Pandemic

spheres of life to effectively face the challenges and live life as responsible citizens on par with the advantaged children.

TSWREIS functions relentlessly to implement every national and international scheme and provide vast scope for students to develop in their potential area. A brief list of the curricular and co-curricular activities is as follows:

Academics. It include interactive classes. Online classes are effectively conducted during the COVID pandemic through webinars and extension lectures by learned speakers.

E-Learning. Students and lecturers share their knowledge general and academic through common online platform through youtube channels, google and zoom meets.

Emerging writers. Efficient writers among the students are encouraged towards creative and professional writing through special courses and their write ups are published in their college magazines every month.

Summer Undergraduate Research Fellowship (SURF): Research orientation is developed among the students through SURF. During COVID Pandemic, Virtual SURF is implemented. SURF provides internship opportunities in reputed national and international Universities.

Special PG entrance Coaching: Special classes to crack PG entrance exams of various state and central universities and **GRE /IELTS** coaching for students who aspire for higher education abroad are provided.

International Cultural Exchange Programs. In collaboration with international organizations, students are facilitated with exchange programmes to make progressive social and cultural impact in international relationships.

Girl Boss Programme. It teaches girls how to effectively manage all kinds of roles and responsibilities with safety and security as a successful women in life.

Extension activities-Village Level Learning Centers. It is teaching cum learning programme to educate masses during the pandemic. Students become the teachers, learn the subject and teach to the fellow students in their villages.

Self Learning Activity (SLA). Active parents will be identified and appointed as Conveners to monitor their children's education and other activities as well as interact and motivate other parents to monitor their children.

National Service Scheme (NSS) includes various activities like Swatchta Pledge, COVID Vaccination Awareness Programme, celebration of national festivals like Parakram Divas and Constitution Day.

Sabala Hub Activity. It empowers girl students to engage in entrepreneurship activities like earning money by organizing a food fest, selling arts and crafts, running a stationary and stall every weekend.

Sleep Quality of Residential Degree College Students During COVID-19 Pandemic

DAD program. Dream a Dream program empowers and equips students with basic life skills to achieve success in their lives.

TASK Program. A computer literacy program to enable students to learn data coding and computer operating.

MUN: Model United Nations is a model of UN parliament where students learn by enacting the roles of Parliament members.

Regular Physical exercise. Physical education includes yoga, meditation, Jumba dance, karate, Tennicoit, Ball badminton, shuttle and indoor games like chess. Students are coached to reach Olympics. Some students are provided explorative opportunities like climbing Mt Everest to let the world know that the students can reach any height provided the opportunity.

Additionally, screening is done and students are sent for pilot training programs.

Club Activities. Several life skills, communication skills, leadership skills, social responsibilities are taught as part of club activities which include art and craft work, journalism, dance club, movie review and cinematography, book review and writing, astronomy, geography and research.

Life Saving Groups. This group formed by students and care taker will help sick students. These activities uplift the students through psychological, physical and social spheres of life. In order to ensure optimum functioning of the students, they are enriched with mental and physical health. Balanced diet regular health checks are integral part of TSWREIS.

Health monitoring and research. TSWREIS monitor students' health and well-being on a regular basis. As part of this, every year anthropometric and medical examinations are assured. Students' health care facilities are based up on continuous research. As part of this, study of students' stress, mental health and psychological wellbeing is promoted through collaboration with Indian Council of Medical Research and associated organizations. This study reports sleep quality of the social welfare residential degree college students.

Problem

Do the social welfare residential degree college students have poor sleep?

Hypothesis

Social welfare residential degree college students will have good sleep quality.

Objective

This study aimed to screen marginalized women from social welfare residential degree colleges for their sleep quality.

METHODOLOGY

Design

A cross sectional study was conducted on marginalized girls from four Telangana Social Welfare Residential Degree Colleges, India in the month of February, 2020 and during the month of February, 2021 with a twelve months non-interventional interval of COVID-19 pandemic outbreak. First assessment was done when students stayed at residential institute

Sleep Quality of Residential Degree College Students During COVID-19 Pandemic

for a period of 3 months. Sleep quality and life style habits pertaining to one month's residential environment were taken into consideration. During second assessment, students returned back to residential set up after a break of 10 months due to COVID-19 first wave lockdown. Their sleep and life style parameters in the second assessment were pertaining predominantly to the home environment.

Sample

The sample comprised of 805 female students during February, 2020 and 1252 female students during February, 2021. Random sampling method was employed to select students from any four social welfare residential degree colleges for women to screen female students' sleep quality. Sample size was determined using Daniel's formula based on 60% prevalence rate of poor sleep quality[7], 5% margin of error, 95% confidence interval, for a population size of (N=1,50,000) [3]. These students represent all the marginalized students studying in social welfare educational institutes in India. Participants of this study were pursuing graduation in pure sciences, arts and social sciences. Out of four colleges, one college belongs to rural area and three belong to urban area.

Instruments

Pittsburgh Sleep Quality Index (PSQI) developed by Buysse, Reynolds, Monk, Berman and Kupfer (1989) was used to assess sleep quality of college girls[4]. This instrument has internal consistency (cronbach's alpha =0.736), high internal homogeneity with significant correlations between component scores and global score ($p < 0.010$), high-test retest reliability of .85 ($p < .001$) and diagnostic variables well comparable with Polysomnography [5]. PSQI is a self-administered questionnaire which has 19 items to assess sleep quality during the past one month. Sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances use of sleep medication and daytime dysfunctions are the seven components generated from the individual items. A global sum of these components indicates sleep quality. A cut off score of five or more indicates poor sleep quality whereas score less than five indicate good sleep quality. Over all, PSQI scores range between 0 and 21. Along with PSQI, demographic details were collected. A questionnaire surveying sociodemographic variables, daily food and exercise habits was administered and anthropometric measurements were taken.

Procedure

Ethical approval was obtained from Indian Council of Medical Research, National Institute of Nutrition (ICMR-NIN) to do sleep research on marginalized girls studying in the Telangana Social Welfare Residential Degree Colleges for Women TSWRDCs(W).

With the permission of the governing bodies, colleges from four different locations viz., Ibrahimpatnam (Rural), Mahendrahills (Urban), Budvel (Urban) and L. B. Nagar (Urban) were randomly selected. These colleges provided sample for the study from Degree I & II years. In every college respective students were assembled together at one place (Seminar hall), briefed about the study and consented for screening their sleep quality. Students who suffered from any illness, who were under medication, who had previously underwent psychotherapy were excluded from the study.

A sample of n=805 students (Degree-I & II year; B.A., B. Sc., B. Com) were consented and assessed for their sleep quality and demographic details in February, 2020 and after a non-interventional pandemic duration of twelve months, the same students along with freshers

Sleep Quality of Residential Degree College Students During COVID-19 Pandemic

(n=1252) from Degree-I, II and III years were reassessed during February, 2021 using PSQI, height measuring rod, weighing machine and demographic details sheets.

RESULTS

A survey of demographic details and sleep quality assessment was done for n=805 participants in February, 2020 (study-1) and n=1252 participants in February, 2021 (study-2).

All the participants were unmarried females whose age ranged between 18-25 years.

Study - 1.

Of 805 participants, 152 (20%) students were from Arts, 244 (32%) were from Statistical sciences, 198 (26%) were from Biosciences, and 129 (20%) were from Mathematical sciences. 98% of the student hailed from low socioeconomic status (SES), while 2% from middle SES.

Study - 2.

Of 1252 participants, 388 (31%) students were from Arts, 400 (32%) were from Statistical sciences, 300 (24%) were from Biosciences, and 164 (13%) were from Mathematical sciences. 84% of the student hailed from low socioeconomic status(SES), while 15.3% from lower middle SES and 0.7% from upper middle SES. (Refer table-1 for demographic details).

Table No. 1 Demographic variables of participants during 2020 & 2021

S N	Demographic and Lifestyle variables	2020 statistics- n (%)	2021 statistics- n (%)
1	Age	18-25 YEARS	18-25 YEARS
2	Gender	Female	Female
3	Marital status	Single	Single
4	Education	Gradation	Graduation
5	Occupation	Students	Students
6	Socio economic status	High-2(0.3%) Middle-19 (2.7%) Low-745 (97.5%)	9(0.3%) 197(15.7) 1051 (84%)

Anthropometric measurements

In study 1, during 2020, 69% of the participants had normal Body Mass Index (BMI), 30% had underweight and 1% had pre-obesity values based on manual measurement of height and weight. During 2021 (study 2), 73% had normal BMI, 23% had underweight and 4% were pre-obese (Table - 2).

Life style assessment

Illness among the participants was reported by 2.5% and 1% in Study 1 and 2 respectively. Regular food intake was noted in 80% and 87.5% in study 1 and 2 respectively. 7% and 3% of the study-1 and 2 participants respectively reported having less than 3 meals per day. 73% of study 1 participants had one snack per day while 27 % consumed more than 1 snack per day. In study 2, 80% consumed one snack per day while 20% had more than once. 200ml of tea/coffee (stimulants) was taken by 23.5% and 16% of study-1 and 2 participants respectively. Milk consumption was reported by 54% of study 1 and 52% of study 2

Sleep Quality of Residential Degree College Students During COVID-19 Pandemic

participants. 98% of study 1 participants and 97% of study 2 participants participated in regular physical exercise. From study 1 participants, 76% did mild exercise and 24% did moderate exercise while from study 2 participants, 72% did mild and 20% did moderate and 8% did vigorous exercise. 66% and 58% of study-1 and 2 participants respectively practiced regular yoga. Regular pranayama practice was reported by 64% of study 1 and 67% of study 2 participants. Overall 64% of study 1 participants had at least one poor life style habit while the same was observed in 67% of study 2 participants (Refer Table 2).

Table No. 2 Lifestyle variables & Sleep quality of participants during 2020 & 2021

S. no.	Life style variables	Description					
		Underweight	Normal	Preobesity	Underweight	Normal	Pre obesity
1	BMI	226(30%)	526(69%)	9(1%)	289(23%)	908(73%)	55(4%)
S. no.	Life style variables	Yes	No	Yes	No		
1	Illness	19(2.5%)	745(97.5%)	12(1%)	1240(99%)		
2	Regular food intake	610(80%)	154(20%)	1095(87.5%)	157(12.5%)		
3	Three meals per day	757(99%)	7(1%)	1217(97%)	35(3%)		
4	One snack per day	554(73%)	210(27%) more or less than 1 snack	1000(80%)	252(20%)		
5	Stimulants (Tea/Coffe) per day	179 (23.5%)	585(76.5)	200(16%)	1052(84%)		
6	Milk consumption	411(54%)	353(46%)	653(52%)	599(48%)		
7	Regular exercise	748 (98%)	15(2%)	1212(97%)	40(3%)		
8	Exercise type	76%-mild, 24% -moderate	NA	896(72%)-mild, 250(20%) - moderate, 106(8%) - vigorous	NA		
9	Regular Yoga	506(66%)	258(34%)	721(58%)	531(42%)		
10	Regular Pranayama	503(66%)	269(34%)	705(56.3%)	547(43.7%)		
11	Atleast one poor life style habit	489(64%)	275(36%)	836(67%)	416(33%)		
12	Poor Sleep Quality	65.052%	34.948%	52%	48%		

Sleep parameters

Study 1

During February, 2020, sleep quality assessments revealed poor sleep quality in 65.05% of the college students and good sleep quality in 34.95% of the college students (Table-2). Subjective sleep quality was fairly good in 37.5%, very good in 45.8%, fairly bad in 13.2% and very bad in 3.4% of the of the study participants. 49.2% of the study participants reported that they never had insomnia whereas 30% reported having insomnia less than once in a week, 16% reported having insomnia once or twice in a week and 4.45% reported having insomnia thrice or more times in a week. Sleep duration was more than 7 hours in

Sleep Quality of Residential Degree College Students During COVID-19 Pandemic

36.65% of the students, 6-7 hours in 13.22 %, 5-6 hours in 36%, less than 5 hours in 14% of the students. Sleep efficiency was more than 85% in 79.8% of the students, 75-85% in 12% of the students, 65-74% in 5.5% of the students and <65% in 2.6% of the students. 37% of the students reported that they never had sleep disturbances, 52.6% reported sleep disturbances occurring less than once a week, 9.8% reported having sleep disturbances once or twice a week, 0.5% reported having sleep disturbances thrice or more times in a week. Usage of sleep medication was reported by 5.5% of the students and 94.5% never resorted to sleep medication. 49.35% of the participants reported that they never had day time disturbances. 26.7% reported having day time disturbances less than once a week, 19.10% reported having daytime disturbances once or twice a week and 4.84% reported sleep disturbances occurring three or more than three times a week (Table 3)

Table No. 3 Percentages of component wise PSQI scores of TSWR degree college girls, 2020

Subjective Sleep Quality	Insomnia	Sleep Duration	Sleep Efficiency	Sleep Disturbances	Sleep Medication	Day time disturbances
45.81152 (Very Good)	49.21 466 (0)	36.64921 (>7 hours)	79.84293 (>85%)	37.04188 (0)	94.50262 (0)	49.34555 (0)
37.56545 (Fairly Good)	30.23 56(1)	13.2199 (6-7 hours)	12.04188 (75-84%)	52.6178 (1)	2.356021 (1)	26.70157 (1)
13.2199 (Fairly Bad)	16.09 948 (2)	35.99476 (5-6 hours)	5.497382 (65-74%)	9.816754(2)	2.61780 (2)	19.10995 (2)
3.403141 (Very Bad)	4.450 262 (3)	14.13613 (<5 hours)	2.617801 (<65%)	0.52356 (3)	0.52356 (3)	4.842932 (3)

*0=Never, 1= Less than once in a week, 2= Once or twice in a week, 3=Thrice or more times in a week

Study 2

During February, 2021, 52% of the college students were assessed with poor sleep quality while 48% had good sleep quality (Table 2). Subjective sleep quality was fairly good in 39.9%, very good in 42.89%, fairly bad in 13.42% and very bad in 3.67% of the of the study participants. 46.96% of the study participants reported that they never had insomnia whereas 31.55% reported having insomnia less than once in a week, 16.69% reported having insomnia once or twice in a week and 4.71% reported having insomnia thrice or more times in a week. Sleep duration was more than 7 hours in 32.66% of the students, 6-7 hours in 13.74%, 5-6 hours in 38.26%, less than 5 hours in 15.25% of the students. Sleep efficiency was more than 85% in 78.51% of the students, 75-85% in 12.38% of the students, 65-74% in 5.91% of the students and <65% in 3.11% of the students. 33.22% of the students reported that they never had sleep disturbances, 55.75% reported sleep disturbances occurring less than once a week, 10.46% reported having sleep disturbances once or twice a week, 0.48% reported having sleep disturbances thrice or more times in a week. Usage of sleep medication was reported by 5.8% of the students and 94.2% never resorted to sleep medication. 45.6% of the participants reported that they never had day time disturbances. 28.27% reported having day time disturbances less than once a week, 20.60% reported having daytime disturbances once or twice a week and 5.43% reported sleep disturbances occurring three or more than three times a week (Table 4).

Sleep Quality of Residential Degree College Students During COVID-19 Pandemic

Table No. 4 Percentages of component wise PSQI scores of TSWR degree college girls, 2021

Subjective Sleep Quality	Insomnia	Sleep Duration	Sleep Efficiency	Sleep Disturbances	Sleep Medication	Day time disturbances
42.89137 (Very Good)	46.96486(0)	32.66773 (> 7 hours)	78.51438 (>85%)	33.22684(0)	94.16933(0)	45.60703(0)
39.9361(Fairly Good)	31.54952(1)	13.73802 (6-7 hours)	12.38019 (75-85%)	55.7508(1)	2.715655(1)	28.27476(1)
13.41853(Fairly Bad)	16.69329(2)	38.25879 (5-6 hours)	5.910543 (65-74%)	10.46326(2)	2.555911(3)	20.60703(2)
3.674121(Very Bad)	4.71246(3)	15.25559 (<5 hours)	3.115016 (<65%)	0.479233(3)	0.479233(4)	5.43131(3)

***0=Never, 1= Less than once in a week, 2= Once or twice in a week, 3=Thrice or more times in a week**

DISCUSSION

Healthy sleep is one prerequisite for student's optimum attention and wakefulness in classroom environment. Morning freshness after a deep and unfragmented night sleep is likely to enhance students' energy in academic and co-curricular endeavours throughout the day. Lack of 7-9 hours of uninterrupted night sleep is termed as 'poor sleep quality' by National Sleep Foundation. [6].

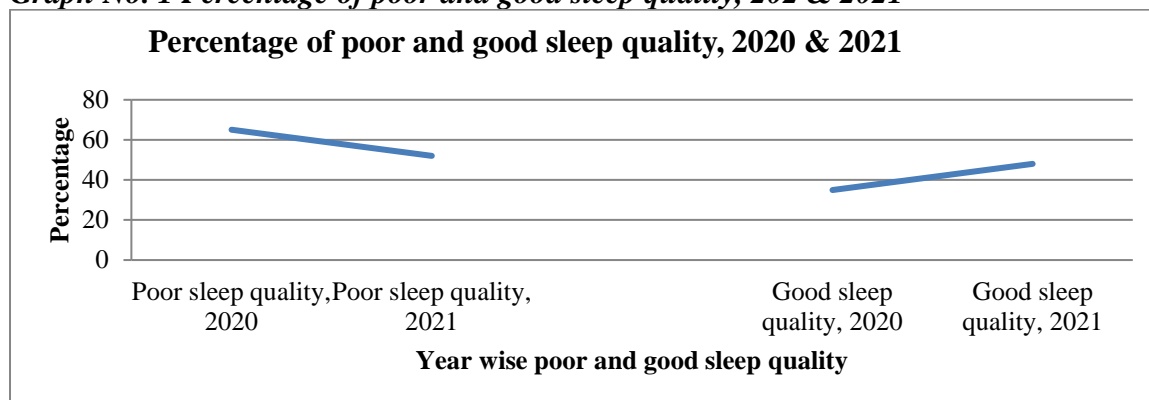
Sleep health research showed diverse prevalence rates of poor sleep quality (20-60%) across the world. International studies reported 64% prevalence [7] while Indian study reported 34% poor sleep quality among graduates from a mixture of educational courses [8]. Students' sleep health is least researched in India. Poor sleep has significant correlation with academic, physical and psychological aspects of college students [9][10][11], there is an increasing need for research focus on students' sleep health. Kaur (2018) reported that "there is dearth of research on sleep health in India"[8]. Therefore this study examined the sleep quality of a student representative sample from Telangana Social Welfare Residential Educational Institutions Society (TSWREIS).

Before the conception of the study, it was assumed that all the students in social welfare educational institutes will have good sleep quality due to highly protective and structured environment. But the results have disproved the hypothesis. Though the life style variables show that more than 98% of the participants were healthy, 62% of them still had poor sleep quality when they were in the college. When students moved to their home, the percentage of candidates with illness as well as poor sleep reduced by 1.5% and 13% respectively. This indicates that students have good health and good sleep at home when compared to hostel. Also when students stayed in hostel for a month, 80% of them had regular food intake, whereas when they returned from home 87% had regular food intake indicating the likelihood of skipping meals at hostel. Consumption of milk reduced from 54% to 52% indicating more intake of milk when at college when compared to home. Regular exercise was performed by 99% of the participants in 2020 whereas 98% performed regular exercise in 2021. Percentage of participants who did yoga and pranayama was 66% in 2020 where as in 2021, percentage of yoga practitioners and pranayama practitioners reduced by 8% and 10% respectively. In 2020, at least one of the above mentioned poor health habit was reported by 64% in 2020 which increased to 67% in 2021. This can be due to lack of Physical activity supervisors at home during 2021.

Sleep Quality of Residential Degree College Students During COVID-19 Pandemic

This study found that COVID-19 brought few slightest positive shifts and few negative shifts in sleep health variables of social welfare residential college girls. Percentage of poor sleep quality among social welfare degree college students reduced from the year 2020(65%) to 2021(52%) whereas good sleep quality percentage increased from 2020 (35%) to 2021(48%) (Graph 1). These findings negate the recent findings which reported increased insomnia rates [12].

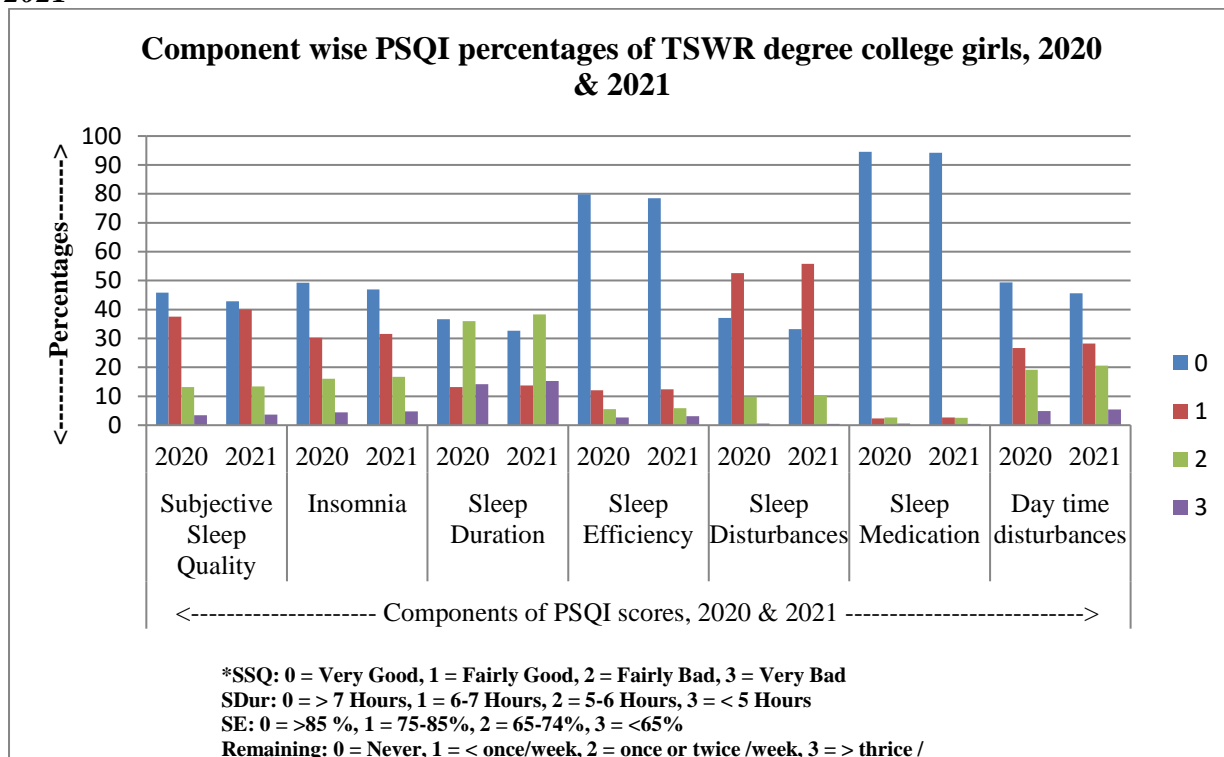
Graph No. 1 Percentage of poor and good sleep quality, 202 & 2021



Component wise sleep quality scores showed varying scores pre and post covid-19 first wave period. In 2020, 13.22% reported fairly bad and 3.4% reported very bad subjective sleep quality whereas in 2021, 13.41% reported fairly bad and 3.6% reported very bad subjective sleep quality. There are slightest fractional differences. Very good and fairly good subjective sleep quality was reported by 45.8% and 37.57% students respectively during 2020 whereas in 2021, 42.89% reported very good and 39.93% reported fairly good subjective sleep quality. Percentage of very good subjective perception decreased by 3% while percentage of subjective perception of fairly good sleep quality increased by 2.36%. These percentages indicate decreased perception of very good subjective sleep quality and increased perception of fairly good subjective sleep quality after first wave COVID-19. In contrast to this, percentage of students reporting initial insomnia at least once a week increased by approximately, 2% from 2020 to 2021 and those who reported never having insomnia decreased by 2%. These findings are in line with the study done by Gupta et al. (2020) in which increased sleep latency was reported and reduced sleep duration [13]. In this study, percentage of students who reported more than 7 hours of sleep reduced from 36.65% (in 2020) to 32.66% (in 2021). There is 4% reduction in percentage of students having more than seven hours of sleep after COVID-19. Similarly sleep efficiency reduced by 1.33% from 79.84% in 2020 to 78.51% in 2021. Notable change occurred in sleep disturbances. Percentage of students who reported never having sleep disturbances reduced by 3.82% from 37.04% in 2020 to 33.22% in 2021. This indicates that sleep disturbances like breathing problem, nightmares, pain in the body, waking up in the middle of the night, feeling too hot or too cold, coughing or snoring during the night increased post fist wave COVID-19. Also 3.75% of participants who never had day time disturbances due to sleep deficit reported day time disturbances post COVID-19 period. This indicates that the percentage of college students who faced day time disturbances at least once a week increased by 4%. A comparative graphical representation of sleep scores of participants between the years 2020 and 2021 is showed in Graph 2. Though there are slight differences in the sleep variables pre and post COVID-19, these do not show any significant differences.

Sleep Quality of Residential Degree College Students During COVID-19 Pandemic

Graph No. 2 Component wise PSQI percentages of TSWR degree college girls, 2020 & 2021



Slight increase in subjective sleep quality scores and reduction in percentage of poor sleep quality can be traced to the additional sample added during 2021. Degree first year students' sleep quality was assessed in 2021. These students' life style and sleep patterns differ from the residential institutional time table. Residential college students have strict sleep time table which students tend to flout due to unhealthy sleep habits such as overnight chit chat, turning on lights during the night, piled up academic works, exams etc. Reduction in sleep duration and sleep efficiency is reported in other literature post COVID-19 due to increased screen time during lock down period [13]. Increase in sleep disturbances and day time disturbances are likely due to lockdown effects.

Post COVID-19 reduction in the percentage of poor sleepers can also be traced to lockdown and closing of the residential educational institutions. Lack of academic seriousness at home and availability of extra hours for sleep has decreased poor sleep quality among students. However, at college, tedious mental and physical activities are resulting in poor sleep quality despite medical illnesses. Studies have proven that poor sleepers had significant low academic performance [14]. There residential educational institutions and parents have to ensure that the students have sleep according to the recommendations of NSF.

CONCLUSION

College students in residential educational institutes have 65% poor sleep quality which reduced by 13% at home environment. The hypothesis which has stated that the social welfare residential college students will not have poor sleep quality is disproved. Subjective sleep quality, sleep disturbances and daytime disturbances increased post-COVID-19 first wave pandemic. There is need for intervention.

Limitations

Due to unprecedented lockdown during the first phase COVID-19 pandemic, students were suddenly moved to their families from the residential colleges during March, 2020. They were not provided intervention after sleep quality assessment. Further studies will have to ensure necessary intervention for the existing sleep problems.

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Sleep Quality of Residential Degree College Students During COVID-19 Pandemic

Acknowledgement

The author appreciates all those who participated in the study and helped to facilitate the research process.

Conflict of Interest

The author declared no conflict of interest.

How to cite this article: Vanaja P. (2022). Sleep Quality of Residential Degree College Students During COVID-19 Pandemic. *International Journal of Indian Psychology*, 10(1), 1243-1254. DIP:18.01.127.20221001, DOI:10.25215/1001.127